Process optimization for MEA/DIPA mixed amines from the perspective of a Vapor-Liquid Equilibrium

문지훈, 신범주, 김승모, 최봉근,

김경민[1], 민병무[2], 이웅[3], 문종호[†]

충북대학교; [1]강릉원주대학교; [2]한국에너지기술연구원; [3]한국과학기술연구원

(moonjongho@chungbuk.ac.kr[†])

This paper reports the newly measured experimental data for CO_2 solubility in a blended aqueous solution of Monoethanol amine (MEA) and Di-isopropanol amine (DIPA) at different amine mixing ratios (MEA:DIPA:H_2O = 9:21:70, 15:15:70, and 21:9:70 wt %) and working temperatures (323.15, 343.15, 373.15 and 383.15 K). The successive substitution method [1] was used for calculating the mole fractions of all molecules (four molecules) and electrolytes (three cations and five anions) from the equilibrium, along with the material and charge balance equations (12 equations). The Novel shortcut method suggested by Lee et al. [2] was used to investigate regeneration energy of stripper for process optimization. Using the above mentioned thermodynamic models, the partial pressures of CO_2 in the gas phase, mole fractions of all components in the liquid phase, heats of absorption, and cyclic capacities of CO_2 according to the absorption/desorption temperature and the blending ratio of MEA/DIPA/H_2O were estimated.